CLAIMS

1. An assembly of sensors formed as an imager each sensor delivering a signal corresponding to one pixel of the image, and having,

a detection brick with a detection zone including a photosensitive material,

a brick for addressing and optionally processing signals from the sensors, this brick notably bearing an addressing circuit and,

an interconnection brick located between the detection brick and the addressing brick, each brick bearing connection pads connecting the sensors of the imager to the addressing circuit, so that the signals from the sensors are individualized,

characterized in that the photosensitive material of the detection brick contains at least one polymorphous silicon layer.

2. The assembly of the sensors forming an imager, according to claim 1, characterized in that the polymorphous silicon layer has a thickness less than 4,000 angstroms.

3. The assembly of the sensors forming an imager, according to claim 1, characterized in that the interconnection brick is formed by pads (5, 5') embedded in an insulator (1, 2, 3).

4. The assembly of the sensors forming an imager, according to claim 1,

characterized in that the interconnection pads (5, 5') are either in aluminium or copper or tungsten or chromium.

5. The assembly of the sensors forming an imager, according to claim 3, characterized in that the insulating material embedding the pads, is formed by a stack of dielectric layers forming Bragg mirrors.

6. The assembly of the sensors forming an imager, according to claim 3, characterized in that electrodes (64, 94) are formed above the pads (5, 5'), these electrodes having a lower surface electrically coupled with a pad (5) and an upper surface, the upper surface of the electrode having a larger surface dimension than the lower surface in contact with the pad.

7. The assembly of the sensors forming an imager, according to claim 6, characterized in that the upper surface of the electrodes is cup-shaped.

8. The assembly of the sensors forming an imager, according to claim 6, characterized in that a lower portion of each electrode is embedded in an insulator layer, an upper portion of this electrode being just above said insulator layer.

9. The assembly of the sensors forming an imager, according to claim 8, characterized in that the insulator layer surrounding a lower portion of the electrodes consists of a stack of layers forming Bragg mirrors.

10. The assembly of the sensors forming an imager, according to claim 6, characterized in that the electrodes (64, 94) are either in aluminium or copper or tungsten or titanium or chromium or titanium nitride or a doped semiconductor or an organic conductor or even finally a composite stack of the aforementioned materials.

11. The assembly of the sensors forming an imager, according to claim 6, characterized in that the polymorphous silicon layer (76) is placed above the layer including the insulator and the electrodes.

12. The assembly of the sensors forming an imager, according to claim 11, characterized in that at least one upper silicon layer (79) has a lower portion containing carbon and an upper portion containing boron.

13. The assembly of the sensors forming an imager, according to claim 1, characterized in that the thickness of the polymorphous silicon layer (46) is between 0.5 and 2 μm.

14. The assembly of the sensors forming an imager, according to claim 1, characterized in that the detection zone including the polymorphous silicon is an intrinsic zone of a PIN or NIP diode.

15. The assembly of the sensors forming an imager, according to claim 12,

characterized in that electrodes 64, 94, are formed above pads 5, 5', and these electrodes being etched in an n or p material layer.

16. The assembly of the sensors forming an imager, according to claim 10, characterized in that at least one of the electrodes contains an n doped material.

17. The assembly of the sensors forming an imager, according to claim 10, characterized in that at least one of the electrodes contains a p doped material.

18. The assembly of the sensors forming an imager, according to claim 9, characterized in that at least one of the electrodes contains an n doped material.

19. The assembly of the sensors forming an imager, according to claim 1, characterized in that the polymorphous material layer is an intrinsic layer placed above the electrodes.

20. The assembly of the sensors forming an imager, according to claim 2, characterized in that the polymorphous material layer is an intrinsic layer placed above the electrodes.

21. The assembly of the sensors forming an imager, according to claim 12, characterized in that the polymorphous material layer is an intrinsic layer placed above the electrodes.

22. The assembly of the sensors forming an imager, according to claim 19, as depending on claim 17, characterized in that a p doped layer is placed above the amorphous silicon layer, thereby producing a NIP diode.

23. The assembly of the sensors forming an imager, according to claim 20, as depending on claim 17, characterized in that a p doped layer is placed above the amorphous silicon layer, thereby producing a NIP diode.

24. The assembly of the sensors forming an imager, according to claim 21, as depending on claim 17, characterized in that a p doped layer is placed above the amorphous silicon layer, thereby producing a NIP diode.

25. The assembly of the sensors forming an imager, according to claim 19, as depending on claim 18, characterized in that an n doped layer is placed above the intrinsic amorphous silicon layer thereby producing a PIN diode.

26. The assembly of the sensors forming an imager, according to claim 20, as depending on claim 18, characterized in that an n doped layer is placed above the intrinsic amorphous silicon layer thereby producing a PIN diode.

27. The assembly of the sensors forming an imager, according to claim 21, as depending on claim 18, characterized in that an n doped layer is placed above the intrinsic

amorphous silicon layer thereby producing a PIN diode.

28. The assembly of the sensors forming an imager, according to claim 6, characterized in that the pads include an upper metal surface, and in that the polymorphous material layer is directly placed in contact with the pads.

29. The assembly of the sensors forming an imager, according to claim 28, characterized in that an n doped layer is placed above the polymorphous silicon layer.

30. The assembly of the sensors forming an imager, according to claim 28, characterized in that a p doped layer is placed above the polymorphous silicon layer.

31. The assembly of the sensors forming an imager, according to claim 30, characterized in that the electrode is in conducting transparent oxide.

32. The assembly of the sensors forming an imager, according to claim 30, characterized in that the electrode is produced in a layer of a metal partly transparent to ultraviolet radiation.

33. The assembly of the sensors forming an imager, according to claim 30, characterized in that the upper electrode is a metal grid.

34. The assembly of the sensors forming an imager, according to claim 30,

characterized in that the electrode is formed by two combs each having teeth, the teeth being interdigitated.

35. A method for producing an assembly of photo-detectors according to claim 6, characterized in that:

after producing a substrate notably including an addressing circuit and optionally signal processing circuits,

one or several layers of insulating materials are deposited,

said layer is etched so as to form holes in this layer,

some holes are filled with a conducting material thereby forming interconnection pads (5, 5'),

mechano-chemical polishing is carried out optionally,

one or more insulating material sublayers are deposited,

said insulating material sublayer is etched above pads (5, 5'),

a layer is deposited above the etched insulator layer, thereby forming a non-planar conducting material layer, cups appearing above the pads,

the conducting material layer which has just been deposited, is etched, in order to form electrodes separated from each other,

an unintentionally doped polymorphous material layer is deposited,

a doped layer is deposited,

a conducting material (24) layer forming an upper electrode is deposited finally.

36. The method according to claim 35, characterized in that the temperature for

depositing the polymorphous material is between 175°C and 250°C.

37. The method according to claim 35, characterized in that the polymorphous material deposit is followed by a deposit of a layer containing carbon at least in its lower portion.

38. The method for producing an assembly of sensors according to claim 3, characterized in that:

the method comprises a step for depositing a polymorphous silicon layer, this layer coming into contact with either a metal upper portion of conducting pads, or n doped or p doped electrodes, themselves in contact with a conducting pad, this step for depositing the polymorphous silicon layer being produced by a PECVD (Placement Enhanced Chemical Vapor Deposition) method, and at a temperature between 150 and 250°C.